

Helminths of the gastrointestinal tract among children in Kano, Northern Nigeria

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Abstract

An epidemiological survey of helminths of the gastrointestinal tract among school aged children drawn from four schools within Kano metropolis with mean age of 12.6 years was carried out by examining their stool samples for ova or larva of Intestinal parasites. A total of 570 samples were analysed using formol ether concentration method and out of these, 130 were positive for helminthic infestation with a prevalence of 22.8%. Out of 570 samples collected, 310 stool samples were from males while 260 samples were from the females but 75 males and 55 females were infected with prevalence rates of 24.2% and 21.2% respectively. *Ascaris lumbricoides*, Hookworm and *Trichuris trichuria* had the prevalence of 7.9%, 5.3% and 3.5% respectively while others included *Hemenolepis nana* (1.8%), *Diphylobotrium latum* (1.8%), *Hemenolepis diminuta* (0.9%), *Enterobius vermicularis* (0.9%) and *Fasciola hepatica* (0.9%). The prevalence of intestinal parasitosis was high among the pupils of ≥ 11 years in this study, with high prevalence of *Ascaris lumbricoides* (10%) but highest prevalence of 4.3% of *Trichuris trichuria* was observed amongst the pupils of 11-14 years while the children of 15-20 years had the highest prevalence of hookworm. The highest number of eggs per participant in the study was 3000 while the lowest was 200.

INTRODUCTION

The phylum helminths are metazoans belonging to the animal kingdom and they are made up of three classes; nematoda, cestoda and Trematoda. Common gastrointestinal helminthes include *Taenia Saginata*, *Taenia Solium*, *Strongiloides Stercoralis*, *Ascaris lumbricoides*, Hookworm (*Necator americanus* and *Ancylostoma duodenale*), *Enterobius Vermicularis*, *Hymenolepis nana*, *Echinococcus granulosus*, *Fasciola hepatica*, *Schistosoma mansoni* and *Schistosoma Japonicum*^[1]. The adult worm lives in the intestinal tract. Some are oviparous (lay larva) and infection is by ingestion of infective eggs or by the infective larvae penetrating the skin. Ingesting infected animals food or drinks especially polluted can foods also can be a source of transmission. Low standard of sanitation and poor social-economic conditions are also predisposing factors to infection^[2,3]. Effect of intestinal parasite on the working populace is difficult to assess, though Okpala^[4] attempted a survey of intestinal parasites among government workers in Lagos but it is believed that the effect is heaviest among children. Studies have been conducted in Nigeria to determine the degree of helminthiasis by various researchers. Okpala(1961) recorded prevalence of 73.3%, 38.9% and 14.9% for *Ascaris lumbricoides*, *Trichuris trichuria* and Hookworm infections respectively while Ogbe and Odudu(1990) reported the infection rates of 71.5%, 66.5% and 58.3% for *Ascaris lumbricoides*, *Trichuris trichuria* and Hookworm among workers in Lagos^[4,5] while studies from other parts of Nigeria showed similar values of 7.9%, 5.3% and 3.5% for *Ascaris lumbricoides*, Hookworm and *Trichuris trichuria* respectively^[6-10]. Studies have shown that *Ascaris lumbricoides*, *Trichuris trichuria* and Hookworm are the most prevalent helminthic infections, however, age, local climatic conditions, socio-economic factors, population of the study groups and methods of examination of the stool samples

could influence the prevalence of helminthes^[5,11-16]. Nematodes have been shown to be primarily a cause of morbidity than mortality as hookworm disease is associated with iron deficiency anemia and *Taenia solium* associated with cerebral cysticercosis resulting to epilepsy while *Ascaris lumbricoides* causes obstruction of the large biliary and pancreatic ducts^[17].

This study is aimed at the determination of the prevalence of the helminths of the intestinal tract among children in Kano as scanty information is available on this subject.

MATERIALS AND METHODS

The Study Area and Subjects:

The epidemiological survey was carried out in four schools within Kano municipality. Kano is a large city in northern Nigeria with a population of over 9 million with Sudan savanna vegetation. The hottest months are April and May while the coldest are December and January. The rainy Season varies from May to October. It has an average rainfall of 140mm, with an average of 65 rainy days per annum. Majority of the people are Hausas and fulanis with few other tribes such as Yorubas Igbos, Kanuris, Igalas and Igbiras as settlers. Most of the inhabitants are subsistent farmers while other occupations in the area include petty trading, cattle rearing and civil service. 570 healthy children were selected randomly with lottery method⁵ from four schools and the analyses carried out at Medical Microbiology and Parasitology Department of Aminu Kano Teaching Hospital which is the tertiary referral center serving a major part of the northern Nigeria including Gombe, Katsina, Bauchi, Zamfara etc. Stool samples were voided, collected and analysed the same day using formol-ether concentration technique as described by Cheesbrough (1999) for stool concentration and microscopy^[18]. The Stoll's counting method technique as described by Cheesbrough (1999) for counting the helminthes eggs^[18].

RESULT

Spectrum of intestinal parasites among school children in Kano metropolis is summarized in table 1. *Ascaris lumbricoides* accounted for the highest prevalence of intestinal parasites (7.9%) followed by *Hookworm* (5.3%) and *Trichuris trichuria* (3.5%) while the *Hemenolepis nana*, *Hemenolepis diminuta* and *Fasciola hepatica* had the least prevalence (0.9%). Table 2 shows

prevalence of helminthiasis with sex. There was no significant difference between prevalence rate of helminthiasis in males (24.2%) and that of females (21.2%) ($P>0.05$) using chi-square while the overall prevalence of helminthiasis in school children was 22.8%. Table 3 shows prevalence of helminthiasis with age. The prevalence of intestinal parasitosis was high among the pupils of ≥ 11 years in this study. High prevalence rates of *Ascaris*

Table 1. Spectrum of intestinal parasites among school children in Kano metropolis.

PARASITE	INFECTED NUMBER	PERCENT (%)
Ascaris Lumbricoides	45	7.9
Hookworm	30	5.3
Trichuris Trichuria	20	3.5
H. nana	10	1.8
H. Dimunita	5	0.9
Enterobium Verniculaus	5	0.9
Diplylobotrium latun	10	1.8
Fasciola Spp	5	0.9

Table 2. Prevalence of Helminthiasis with sex

	Subjects	Males	Females
Total	570	310	260
Infected number	130	75	55
% infected	22.8	4.2	21.2

Table 3. Prevalence of Helminthiasis with age

	6 - 10years	11-14years	15-20years
Number of subjects	95	350	125
Ascaris lumbricoides	5 (5.3%)	35 (10.0%)	5(4.0%)
Trichuris Trichuria	0 (0%)	15(4.3%)	5(4.0%)
Hookworm	0(0%)	5(1.4%)	25(20.0%)
Hymenolepses nana	0(0%)	5(1.4%)	5(4.0%)
Hymenolepsis diminuta	0(0%)	0(0%)	5(4.0%)
Enterobium vernicularis	0(0%)	5(1.4%)	0(0%)
Diphylobotrium latum	0(0%)	5(1.4%)	5 (4.0%)
Fasciola hepatica	0(0%)	0(0%)	5 (4.0%)

Table 4. Prevalence of helminthiasis among the four schools

	Mariri primary school	Hausawa primary school	Franbeat primary & secondary school	Gyadi-gyadi primary & Secondary School	Grand Total
Total number examined	110	105	180	175	570
Number of positive sample	10	15	30	75	130
Percentage prevalence	9.09%	14.29%	16.67%	42.86%	22.8%

Table 5. Total egg count of each helminth per school.

	Hausawa primary school	Mariri primary school	Gyadi-gyadi primary & Secondary School	Franbeat primary & secondary school
<i>Ascaris lumbricoides</i>	1200epg	1800epg	2600epg	1000epg
<i>Trichuris trichuria</i>	-	-	800epg	1200epg
<i>Hookworm</i>	1000epg	-	-	3000epg
<i>Hymenolepis nana</i>	-	-	-	800epg
<i>Enterobius vermicularis</i>	-	1300epg	-	800epg
<i>Diphyloboturun latum</i>	-	-	-	1200epg
<i>Hymenolepis diminuta</i>	-	-	-	800epg

lumbricoides (10.0%) and *Trichuris trichuria* (4.3%) were observed amongst the pupils of 11-14 years while the children of 15-20 years had the highest prevalence of hookworm infection.

Table 4 shows the prevalence of helminthiasis per school. The highest prevalence of 42.86% was obtained from Gyadi-Gyadi primary and secondary school followed by that of Franbeat primary and secondary school (16.67%) and Hausawa Primary school (14.29%) respectively while the lowest prevalence of 9.09% was seen in Mariri Primary School. Table 5 shows the total egg count of each helminth per school. The highest egg count of 3000epg in the study was obtained for hookworm from Franbeat primary and secondary school.

DISCUSSION

The prevalence rates of intestinal parasites have been observed to vary considerably with altitude in different parts of the country^[19-22]. The variation in environmental influence necessitated this study on intestinal helminthiasis amongst school children in Kano.

The study showed overall prevalence of helminthiasis in school age children of 22.8% while *Ascaris lumbricoides* infection accounted for the highest prevalence of intestinal parasites (7.9%), followed by *Hookworm* infection of (5.3%) and *Trichuris Trichuria* of (3.5%). These findings are in agreement

with previous reports^[6-10]. However, the high prevalence rates of *Ascaris lumbricoides*, Hookworm and *Trichuris trichuria* infections could be associated with high level of unhygienic practices among pupils and deficiency of knowledge of preventing oral-faecal infections such as *Ascaris lumbricoides*, *Trichuris trichuria* and hookworm infection^[10,23].

The study further showed no significant difference between the prevalence rate of helminthiasis in males (24.2%) and that of females (21.2%) ($P>0.05$). This observation has further supported earlier findings which showed similar pattern of parasitic infections between males and females^[10,23]. The prevalence of intestinal parasitosis was high among the pupils of ≥ 11 years in this study. However, the highest prevalence rates of *Ascaris Lumbricoides* and *Trichuris Trichuria* were observed amongst the pupils of 11-14 years and these findings could probably be due to poor awareness in the prevention of oral - faecal parasitic infections and unhygienic practices^[10,23] while the highest prevalence of hookworm infection amongst pupils of 15-20 years could be associated with poor environmental hygiene and use of bare feet by the pupils in the school probably due to poverty^[23,24]. However, these findings are in agreement with previous report^[25] but these observations contradicted earlier reports on the prevalence of intestinal parasitosis regarding different age groups as the lower age-group (4-10 years) had the highest prevalence of intestinal parasites while the lowest prevalence was observed amongst children ≥ 14 years^[23,26].

CONCLUSION

In conclusion, the alarming prevalence rate of 22.8% of helminth infections in children should be controlled by providing drugs for the infected children to reduce transmission. Improving sanitary conditions to avoid indiscriminate disposal of faeces and public enlightenment on health education to prevent adverse effects on the physical and mental development in the community that are associated with these infections^[9,27,28].

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